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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/770,732	02/02/2004	Peter R. Bossard	BOSSARD-9	1016

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EXAMINER

LAWRENCE JR, FRANK M

ART UNIT PAPER NUMBER

1724

DATE MAILED: 10/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/770,732

Applicant(s)

BOSSARD ET AL.

Examiner

Frank M. Lawrence

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 8 and 10-20 is/are rejected.
- 7) ☒ Claim(s) 5, 7 and 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Allowable Subject Matter***

1. The indicated allowability of claims 1-20 is withdrawn in view of the newly applied reference(s) to Ma et al. (2004/0237779), Edlund (5,498,278), Ma et al. (6,152,987), Drost et al. (2002/0020298), Bossard (6,183,542) and Peachey et al. (5,738,708). Rejections based on the newly cited reference(s) follow. Note that examination of this application has been transferred to Frank M. Lawrence.

### ***Claim Objections***

2. Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 3 recites that the materials used in the different layers are the same, however claim 1 also recites that they are the same by using "a solid layer of said hydrogen material" which is already defined in line 2.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 4 recites that the porous base layer is not comprised of hydrogen permeable material, however the layer must be hydrogen permeable to function in the disclosed system. The examiner understands that permeable material refers to a membrane material that is

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not porous or perforated, however this is not clear in the claims. Claim 6 is rejected for depending from a rejected base claim.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-4, 6, 10-16, 19 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Ma et al. (2004/0237779).

7. Ma et al. '779 teach a composite membrane for selectively permeating hydrogen from a reaction product mixture, comprising a tubular porous stainless steel substrate (12), a palladium or Group IB metal intermediate diffusion layer deposited on the substrate, a palladium or Pd/Ag alloy membrane layer deposited on the intermediate layer using electroplating or other deposition techniques, and a ceramic or other bonding layer between the substrate and intermediate layer (see figure, paragraphs 10-12, 22, 29, 32, 37-39, 52, 54, 55). The membrane is formed by depositing the layers over the tubular substrate, and hydrogen is purified by causing a pressure differential of the gas mixture over the membrane and collecting purified hydrogen.

8. Claims 12, 13, 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Edlund (5,498,278).

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9. Edlund '278 teaches a method of purifying hydrogen, comprising selectively permeating hydrogen across a composite membrane, wherein the membrane includes a tubed-shaped porous metal support that can be palladium, a metal oxide intermediate layer overlying the support, and a palladium or palladium alloy membrane layer that is deposited on the intermediate layer (col. 7, line 23 to col. 9, line 15).

10. Claims 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Ma et al. (6,152,987).

11. Ma et al. '987 teach a composite membrane for selectively permeating hydrogen from a reaction product mixture, comprising a tubular porous stainless steel substrate (12), a ceramic or metal oxide intermediate diffusion layer deposited on the substrate, and a palladium or Pd/Ag alloy membrane layer deposited on the intermediate layer using electroplating or other deposition techniques (see figure, col. 1, lines 30-32, col. 3, lines 21-54, col. 4, lines 12-65, col. 5, line 45 to col. 6, line 38, col. 7, lines 21-60). Hydrogen is purified by causing a pressure differential of the gas mixture over the membrane and collecting purified hydrogen.

12. Claims 12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Drost et al. (2002/0020298).

13. Drost et al. '298 teach a supported membrane for selectively permeating hydrogen from a gas mixture, comprising porous or sintered metal support layer (3), an intermediate porous diffusion barrier layer (9) deposited on the support layer, and a palladium or Pd/Ag alloy membrane layer (2) deposited on the intermediate layer using chemical or physical vapor deposition (paragraphs 17-20, 34, 38, 39, 52-58).

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14. Claims 1-4, 6, 12 and 14-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Bossard (6,183,542).

15. Bossard '542 teach a membrane for selectively permeating hydrogen from a gas mixture, comprising a palladium or Pd alloy membrane layer (30) that is sandwiched between two porous mesh layers (32, 34) that can be stainless steel using brazing with a layer of brazing powder.

Multiple layers of mesh having differing sizes can be added to each side of the membrane (col. 5, line 1 to col. 6, line 13). The mesh and membrane layers are contoured (figures 2, 3).

16. Claims 12, 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Peachey et al. (5,738,708).

17. Peachey et al. '708 teach a composite metal membrane for selectively permeating hydrogen from a gas mixture, comprising a porous metal substrate, an intermediate metal oxide or metal sulfide layer deposited on the substrate, and palladium or Pd/Ag alloy hydrogen permeable layers deposited on the intermediate layer on each side of the substrate (col. 2, line 58 to col. 4, line 12).

***Claim Rejections - 35 USC § 103***

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al. '779 in view of Drost et al. '298.

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20. Ma et al. '779 disclose all the limitations of the claim except that the porous base layer is a sintered powder having a predetermined particle size. Drost et al. '298 disclose a metal membrane as described in paragraph 13 above. It would have been obvious to one having ordinary skill in the art to use a sintered powder base in order to provide a porous form of stainless steel.

*Allowable Subject Matter*

21. Claims 5, 7 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

*Conclusion*

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The reference to Etievant et al. (2005/0072304) discloses a composite hydrogen permeable membrane.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank M. Lawrence whose telephone number is 571-272-1161. The examiner can normally be reached on Mon-Thurs 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Frank M. Lawrence  
Primary Examiner  
Art Unit 1724

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*Frank Lawrence*

10-18-05